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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/607,779	06/27/2003	Huaqing Yin	169.12-0590	6457

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EXAMINER

TUGBANG, ANTHONY D

ART UNIT	PAPER NUMBER
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3729

DATE MAILED: 03/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/607,779

Applicant(s)

YIN ET AL.

Examiner

A. Dexter Tugbang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 14-16 is/are pending in the application.
- 4a) Of the above claim(s) 3,5,6,9 and 14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,7,8,10-12,15 and 16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 9/17/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election of the invention of Group II-3, Claims 1, 2, 4, 7, 8, 10-12, 15 and 16 in the reply filed on December 21, 2006 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Claims 3, 5, 6, 9 and 14 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on December 21, 2005.

Claim Objections

3. Claim 2 is objected to because of the following informalities: in Claim 2, "a hard" (1st occurrence at line 1 and 2nd occurrence at line 2) should each be replaced with --the hard--; . Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.
5. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In Claim 2, the recitation of “forming a hard mask over an entire top surface of the sensor” (line 2) contradicts the previous step of “removing a portion...hard mask” (line 5 of Claim 1), rendering the claim as being misleading, confusing, vague and indefinite. How is it possible to first have a portion of the sensor be removed if the entire top surface of the sensor is covered with the hard mask?

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 2, 4, 7, 8, 15 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin et al 6,262,869.

Regarding Claim(s) 1, 2, and 7, Lin discloses a method of making a GMR sensor/reader of a magnetic head comprising: forming a sensor (anyone of layers 302, 304, 306, 308 or 310 in Fig. 19G); forming a hard mask (e.g. layer 312) over an entire top surface of the sensor (Fig. 19G); patterning a photoresist mask 362 (Fig. 19H) on a first (e.g. central) portion of the hard mask; removing a second portion (e.g. either side portions) of the hard mask no covered by the photoresist mask and removing a portion (e.g. either side portions) of the sensor not covered by the hard mask (see sequence of Figs. 19H to 19I). The hard mask (e.g. 312) extends from an

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ABS to a distance substantially equal to a desired strip height of the sensor (col. 12, lines 23-27 and col. 12, lines 54-57).

Regarding Claim(s) 4, Lin further teaches forming a first half gap (e.g. layer 322) prior to forming the sensor portion not covered by the hard mask.

Regarding Claim(s) 8, Lin further teaches that the step of removing a portion of the sensor (e.g. anyone of layers 302, 304, 306, 308 or 310) not covered by the hard mask further comprises forming a steep back edge (e.g. edge surfaces 344 or 346) on the sensor.

Regarding Claim(s) 15, Lin alternatively discloses a method of making a magnetic head comprising: forming a first half gap 322; forming a reader (anyone of layers 302, 304, 306, 308 or 310 in Fig. 19G) on the first half gap; forming a hard mask 312 on the reader; patterning a photoresist mask 362 on a first portion of the hard mask; removing a portion of the hard mask not covered by the photoresist mask and removing a portion of the reader not covered by the hard mask to form a back edge (e.g. 344 or 346); removing the photoresist mask (Fig. 19K); and forming a second half gap (e.g. G2 in Fig. 19N) over the hard mask, adjacent the back edge of the reader, and over a portion of the first gap not covered by the reader.

Regarding Claim(s) 16, Lin further teaches that removing a portion of the reader not covered by the hard mask comprises ion milling (col. 12, lines 41-44), which is a form of “end point dry etching” since no wet chemical treatment is used.

8. Claims 15 and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Chang et al 6,434,814.

Chang discloses a method of making a magnetic head comprising: forming a first half gap G1 (in Fig. 14); forming a reader (sensor layer in Fig. 14) on the first half gap; forming a

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hard mask (carbon layer in Fig. 15) on the reader; patterning a photoresist mask 308 on a first portion of the hard mask; removing a portion of the hard mask not covered by the photoresist mask (Fig. 17) and removing a portion of the reader not covered by the hard mask (Fig. 18) to form a back edge (e.g. 322 or 324); removing the photoresist mask (Fig. 20); and forming a second half gap (e.g. G2 in Fig. 21) over the hard mask, adjacent the back edge of the reader, and over a portion of the first gap not covered by the reader.

Regarding Claim(s) 16, Chang further teaches that removing a portion of the reader not covered by the hard mask comprises ion milling (col. 9, lines 11-15), which is a form of “end point dry etching” since no wet chemical treatment is used.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al.

Lin teaches various types of materials for the hard mask (e.g. 312, col. 13, lines 62-65). The selection of materials (i.e. insulating, aluminum nitride, or aluminum oxide) for the hard mask are parameters that are considered to be effective variables to achieve a desired result through routine experimentation. *In re Aller*, 220, F.2d 454, 105 USPQ 233, 235 (CCPA 1955). Therefore, the selection of materials (i.e. recited in each of Claims 10-12) would have been obvious to one of ordinary skill in the art at the time the invention was made in forming a

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magnetic head with a reader. The motivation would have been to achieve a desired result through routine experimentation. Furthermore, the types of materials used for the hard mask have no impact on the process steps as the function of Lin's hard mask 312 has the function of the hard mask, as claimed function, which is to cover and ultimately shape the sensor.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Dexter Tugbang whose telephone number is 571-272-4570.

The examiner can normally be reached on Monday - Friday 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 571-272-4690. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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A handwritten signature in black ink, appearing to read 'A. Dexter Tugbang', written over the printed name.

A. Dexter Tugbang
Primary Examiner
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March 20, 2006